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ABSTRACT

This paper reports a short term intervention in the area of "need to achieve" among disadvantaged preschoolers. Changes in measured intelligence were also examined. The study hypothesized that children receiving need for achievement ("n"-Ach) training would score higher on intelligence tests and evidence more of an increase in need for achievement, as measured by the Aronson Graphic Expressions, than children not receiving such training. The 84 black subjects, 46 boys and 38 girls, were divided into two "n"-Ach training groups and two control groups. All subjects were pretested with the Aronson Graphic Expressions design. "N"-Ach treatment for the experimental groups consisted of one hour of training each morning on Head Start school days for three months. The tasks of the trainer were: (1) training in goal setting; (2) development of achievement language ("I will try harder," "I did it"); (3) development of cognitive supports; and (4) development of group supports. Posttests given were the Standford Binet and Aronson Graphic Expressions. The tested IQ change occurred in the predicted direction but was not significant and there were no significant differences between the two groups in "n"-Ach. The mothers of the children tested were also subjects in a separate "n"-Ach training program. [Not available in hard copy due to marginal legibility of original document.] (AJ)

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"Need Achievement" Training for Head Start Children and Their Mothers

Surang Kowatrakul, Malcolm W. Robinson, and Eugene H. Stivers[1]

Temple University

This paper reports a short-term intervention in the area of need to achieve among disadvantaged pre-school age children. Concommitant changes in measured intelligence are also examined.

Among investigations of need to achieve in pre-school age children must be mentioned McClelland's pioneer use of the Aronson Graphic Expressions to measure need for achievement in five-year-old children and his finding of risk-taking preferences among youngsters of this age level (McClelland, 1958).

The work of McClelland on achievement motivation is based on the assumption that motives are learned. White held that achievement motivation develops out of the child's experience of mastering the environment which he explores and manipulates. Callard (1964) identified sex and social class differences among lower and middle class four-year-old children on measure of need achievement developed by Veroff for children of this age level (Veroff, 1969).

Several studies on the psycho-social origins of need for achievement have found a relationship between child rearing practices or socialization and n-Ach (Winterbottom, 1953 ; Rosen and D'Andrade, 1959 ;

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Crandall, Preston, and Rabson, 1960; Callard, 1964). The results of these studies may be summarized by referring to Rosen and D'Andrade's proposal that two kinds of socialization practices induce achievement motivation. These are 1) achievement training or training in which parents impose standards of excellence upon their child, give evidence of the high goals they wish him to set and of the extent to which they value his competence in performance; and 2) independence training, which refers to efforts on the part of parents in encouraging their child to act on his own, reach his own decisions, and take responsibility for the consequences of his own actions.

It seems likely that it may be possible to develop or increase n-Ach and achievement behavior in young children by designing appropriate methods of n-Ach training. Need for achievement is operationally defined in this study by Aronson n-Ach scores from his Graphic Expressions. In this study, achievement behavior is defined as those behaviors which occur when the individual is engaged in a task and tries to meet some self-set standard of excellence. This is similar to what Veroff called autonomous achievement motivation (Veroff, 1969).

In a longitudinal study of development from birth to adulthood, Kagan and Moss (1962) found that early childhood maternal training procedures constituent to need achievement training can have significant effects upon the Stanford-Binet intelligence scores of girls and effects in the same direction on boys. Kagan's results led us to hypothesize that appropriate need achievement training at early ages may have consequences leading to increased performance levels on measures of intellectual ability.

Zigler and Butterfield (1968) reported changes by lower class nursery school children in Stanford-Binet performance following efforts to increase achievement motivation and reduce fear of failure. Their results were evidence of a need achievement-fear of failure component in intelligence test performance, and lent support to the authors' hypothesis that n-Ach training might increase the performance scores of four year-olds on the Stanford-Binet.

In 1968, Stivers and Kowatrakul launched a pilot study by administering achievement training to thirteen disadvantaged children in one Head Start school. In that study, they employed the concept of "mother surrogate," in which the trainer, a female, role played many of the chacteristics manifested by mothers of high n-Ach children. Among the trainer's responsibilities was that of consciously cultivating achievement values and behaviors on the part of Head Start children who were randomly selected to participate in the n-Ach training.

Pre-test risk-taking behavior and need for achievement (as measured by the Aronson Graphic Expressions) were compared with post-test results on these two variables. Differences between control and experimental groups were found to be statistically insignificant. Case studies, however, revealed major shifts on the part of individual children in regard to n-Ach and achievement behavior.

The present study represents an effort to employ the combined impacts of several techniques adapted from McClelland's method of n-Ach training to maximize achievement motivation and behavior in an experimental sample of pre-school age Head Start children.

Two hypotheses were proposed for investigation in this research:

1. It was expected that there would be a greater increase in intelligence test scores among children who received achievement training than among children who did not receive n-Ach training.

2. It was expected that at the conclusion of the study, need for achievement as measured by the Aronson Graphic Expressions of the children who received n-Ach training would be higher than that of those who did not receive such training.

Method

Subjects

The original sample consisted of one hundred Negro children from four Philadelphia Head Start Centers. Because of sickness and change of addresses, the final sample comprised eighty-four children (forty-six boys and thirty-eight girls). The characteristics of subjects divided randomly among four groups labeled T_1 (n-Ach training group), NT_1 (non-n-Ach training group), T_2, and NT_2 appear in Table 1. The major reason the experiment was set up to include two experimental and two control groups was that the use of the Solomon Experimental Design (Campbell and Stanley, 1968) could control for maturation and pre-test effects.

See Table 1

Table 2 shows the sex, CA, MA, and IQ of Ss by Head Start Center at the conclusion of the study (Spring, 1969).

See Table 2

Procedure

1) Pre-test All subjects in training and non-training groups were given the Aronson Graphic Expressions design 1 and design 2. The test was given to small groups of four children in a large room. The children were brought into the testing room by the experimenter. Directions were given to the subjects in their small groups before they were placed in their corners. The experimenter presented the stimulus cards, which had been enlarged on cardboard to the size of a screen projection. The directions were as follows:

> We are going to play a scribbling game. Do you see this board? On the other side of this board there are many scribbles. I will show you the scribbles, but I will only show you for a very short time. Do you see my stopwatch? Here is how long you will look at the scribbles (E demonstrates 3 seconds on the stopwatch). That is very short, isn't it? So you will have to look at the scribbles carefully because I will take the scribbles away from you and you will not see them any more.
>
> Here (E points to the paper and crayons) are your paper and crayons on which you'll make your own scribbles. Let me see if you can make the scribbles like the ones you saw. If you can't remember all of them, you can make up your own scribbles. And try to do the best that you can. Can you tell me what you are going to do? (Have child repeat instruction). Are you ready now? (E shows board to child for timed three seconds). Then lets S scribble. When child appears to be finished, E asksAre you finished?' If yes, 'That's fine.' Maximum time for S to work is 5 minutes. If child finishes sooner, E should say nothing except, 'Are you finished?'

In order to assure that the directions had been understood, each child was asked to repeat them in his own words.The test

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administrator sent each child to his corner to scribble. The maximum time permitted for scribbling was five minutes; however, any subject finishing before the time limit was permitted to hand in his scribbles. Each child was provided with a 12" x 15" blank piece of drawing paper and a black crayon. A child was placed in each of the corners in order to avoid auditory and visual cues. During the course of the test, the subjects were supervised by the administrator and his assistant in order to assure adherence to the directions.

The Stanford-Binet Intelligence scale, Form L-M was administered prior to experimental treatment to subjects only in n-Ach training group 1 and non-n-Ach training group 1 by a trained, Caucasian adult female.

2) N-Ach treatment. Children in both experimental groups received n-Ach training modified from McClelland's method (McClelland, 1965). Each morning on Head Start school days from the middle of February to the middle of May a trainer at each center started training at 9:30 A.M. and continued training until 10:30 A.M. The hour of training was divided into three periods of twenty minutes each. During each period the trainer removed from two to four pre-assigned children from the Head Start classroom and took these children into the Special Training Room. The major tasks of the trainer were those of McClelland's modified n-Ach training which consisted of (A) training in goal setting, (B) development of achievement language, (C) development of cognitive supports, and (D) development of group supports. The following are the techniques which were employed.

A. Training in Goal Setting Techniques. The trainer encouraged each experimental subject to arrive at specific, realistic goals in accordance with his own ability and also to compete with himself.

Unrealistic, dysfunctional goal setting was discouraged. The trainer used concrete examples geared to the developmental level of the children during the course of n-Ach training to illustrate the consequences of "realistic" and "unrealistic"types of goal setting. In addition to the record the trainer kept of each child's progress charts were used to enable the child to keep track of his own progress and his success in competition with himself.

B. Development of Language of Achievement. The trainer tried to encourage each child to think and converse in terms of goal-setting, knowledge of results, and pleasurable competition with self. Reasons why subjects received rewards were explained to children on each occasion. Phrases and terms such as "I'll try harder," "I did it," "Look how high I can do it, " "I won a prize because . . .," "I received a larger star because . . .," "I'll build a higher tower this time . . .," were taught to the child at the time that the child manifested such behavior.

C. Cognitive Supports: This training category had as its objective to introduce a new associative network into the child's everyday thinking pattern, viz. one centering around the concept that he is the one who can do the job and who can control the environment around him. The trainer used the results of the child's experience in the course of the training to give feedbackto the child which indicated to him what kind of person he was and what he could do. The trainer asked the child at the beginning of the session what he did on the previous day and at the end of the session asked the child what he did and discussed his actions and the reasons why he may have done better (or

worse) today than on the previous day. The objective was to develop understanding of the ingredients of successful achievement and encourage a feeling of "I can do it."

D. Group Supports: The major purposesof this training technique were to give the child a feeling that he was a worthy individual and to provide him with optimal emotional support for autonomous goal setting and independent mastery from the trainer and the members of the group in which he received training. During n-Ach training, the trainer acted as a person who maintained a basically accepting, non-directive attitude. The message that the trainer attempted to convey to each child can be expressed in McClelland's terms as "whoever you are we accept you as worthy of our respect." The trainer also encouraged other children in the training group to applaud the child when he demonstrated achievement behavior and called the attention of the group to the child's progress when he attained his goal.

Post Test:

Stanford-Binet Intelligence scale and Aronson Graphic Expressions were administered to all Ss. The standard procedure of testing was used in administering the Stanford-Binet. The test was given by a trained Caucasian adult male, thus varying sex and insuring non-familiarity with the test administrator. A small group procedure similar to that used in the pre-test of Aronson Graphic Expressions was employed in measuring need for achievement.

The games which were used in the training consisted of the "Monkey Chain Game," the "Tower Construction Game," "Peg Board Design," and "Tinker Toy Construction." A description of the games follows:

Monkey Chain Game

This game is a most simple one but it has merit in training for persistency. There are two forms of this game.

In the first one each child is given twenty-four plastic hanging monkeys and is instructed to attach them in a vertical chain. (Each monkey is attached to each other's curved arms of legs." The child is told to make the monkey chain as long as he can. He is allowed to use both hands and the monkeys can be attached to the top or the bottom of the chain. Only candy is given to the child as a reward. The child is asked to set his own goal before he starts. The game is simple enough that each child can do it at some level; it does not require a high level of manual dexterity but it serves a purpose in helping the child to understand the objectives of training. He sets his own goals and receives a reward according to his own pre-established goal. Attainment of a previously set high goal gains the child a higher reward than the attainment of a previously set lower goal.

In the second form of the game, the child has a more difficult task to perform. He is instructed that he may use only one hand to fasten the monkeys on to the chain. Addition of the first monkey is relatively easy but the second and third are increasingly difficult because, employing the one hand to hold up the top of the chain, the child must try to lift the next monkey from the table using only the arm of the monkey he is holding to catch it. At the same time he must not lose monkeys which are already attached to the chain. Working his way up to the maximum chain length of ten monkeys requires much persistency.

Tower Construction Game

At the outset of this game the n-Ach trainer said to the child, "Today we will build a tower. Let's see how high you can build." Then the child was shown a chart representing the actual height of towers ranging from one to twenty blocks. The trainer asked the child to point on the chart to the tower indicative of how high was his own tower building goal. Next the trainer counted the number of blocks in the tower designated by the child and gave this many blocks to him. The first goal set by the child was treated as "researching the environment" or an attempt on his part (and that of the trainer as well) to assess the difficulty of the task and his entry skill level at it. For some children the first goal setting proved to be realistic -- not too difficult and not too easy. After finishing such a task the child received a verbal reward and was asked whether he would like to try to build a higher tower. For those children for whom the first goal setting was too low, the trainer observed quietly and let the child try to meet his goal. Then she remarked, "That was easy, wasn't it? Would you like to put one more on top to make a higher tower?" She permitted the child to continue piling blocks until she observed that the tower was not stable and might fall down. She then said to the child, "That's very good. Let's see hwo many blocks you built your tower with by counting them." Then the trainer asked, "Now would you like to build a new tower? Show me how high you can build."

Some children set themselves too high a goal. When the tower collapsed before the child attained his goal the trainer asked, "Do you know why it fell down? It fell down because the tower was too high.

Do you know when it started to fall?" The experimenter then suggested that the child set a more realistic goal. The child was encouraged to think of an aspiration level at about the point where the tower began to show signs of collapse.

Peg Board Designs

The child in this task was given a nine inch by nine inch peg board and a box of vari-colored three inch pegs.

There are eight different designs at three levels of difficulty: At the first level of difficulty are included the following tasks. 1. All holes in the peg board are filled with one color. 2. The board is divided vertically, half the board filled with one color, the other half of the board with another color. 3. Each row on the board is filled in a different color.

The second level of difficulty calls for the following tasks. 1. The peg board is divided in fourths (horizontal and vertical) and filled in with four colors. 2. The board is divided into diagonal halves. 3. The board is divided into concentric squares of different colors.

The third level of difficulty requires the child 1. to divide the board into diagonal fourths or 2) to create a linear design, a zigzag, or overlapping squares.

For tasks at the first level of difficulty the child was instructed verbally and if he performed the task successfully he was rewarded with a small star. The trainer then asked the child whether he would like to do a more difficult task and at the same time the child was shown a pattern which had been finished. The second level of difficulty

resulted in a reward of a medium sized star and the third level of difficulty won the child a large star. From time to time the child received a report card to take home. Difficult work, when it was completed, could be taken by the child into his regular classroom to show to his peers.

Tinker Toy Constructions

A child is shown a number of models of tinker toy constructions ranging in difficulty from simple to complex. An example of an easy or "simple" task is a construction of a tinker toy "man" model which consists of nine pieces of material, three different shapes, and one plane. A task of medium difficulty is the construction of an animal such as a cat or a bird, which consists of thirteen to fifteen pieces, five to six different shapes, and more than one plane. A difficult task requires more than twenty pieces, seven to eight different shapes, and three or more planes, often with moving parts. Examples of tasks at this level are an airplane construction, a fishing pole, and a teeter totter. A child is told that if he can make a simple construction he will receive a small star, that a construction of medium difficulty will yield a large star, and that a difficult will merit a large star. If he constructs a "masterpiece" of his own he will earn a badge. Finally, if he collects three badges -- the equivalent of nine large stars, or twenty-seven medium stars , or eight-one small stars -- he will receive a prize. Before a child began his task or chose his model the trainer showed him how to make a simple model of tinker toy construction and asked the child to do it on his own to make sure that the child understood the instructions.

During the period of training the use of rewards or reinforcements was integrated with four elements of achievement training. The purposes of rewards were:

1. to strengthen pleasure feelings of the child who had finished his task successfully according to his goal setting;

2. to encourage the child to try harder by setting realistic goals according to his demonstrated proficiency;

3. to teach the child to seek delayed gratification rather than immediate reward.

There were five kinds of rewards: verbal praise; physical warmth such as embraces; "M & M" candies; symbolic rewards such as small, medium, and large stars and badges; and prizes (dimes, rings, toy cars, multicolored paper pads, crayons, chewing gum).

The reward for each game was slightly different. The trainer explained the reward system of each game to each child and attempted to make sure that the child understood it. The trainer also explained at the outset that the child was setting up a contract to finish some work and that the child was required to finish the work before he received a reward. In case a child chose unrealistic goals, for example if he chose a task which was too difficult for him and which he would be unable to finish, a trainer helped him to select his goal more realistically. There were no time limits on any task. The trainer kept a record of each child in a record book. At the beginning of the n-Ach training period, the trainer took a picture of each child and let him put his picture in a record book, which was to be used as a progress record on each achievement game. Each child also pasted by himself in the record

book the stars or badges which he received as a reward. Every day the trainer reviewed with each child the number of stars and badges he had, why he received them, and the number of stars and badges he would need to win a prize. If a child won a prize at the beginning of the week, the trainer showed the child the prize without giving it to him, asking him instead to wait until the end of the week to receive it. A report card was sent home to tell parents how well their child was doing, how many stars and badges he had received and what prizes he had won. Occasionally a trainer took a child to a class with his finished product, such as a tinker toy or a peg board design. The child usually received approval on his achievement from his peers and teacher. An observational record of each child's behavior also was kept as an additional source of evidence of evidence of behavior change.

n-Ach Training for Head Start Mothers

Prior to the training of children, the mothers of n-Ach training subjects were invited to participate in achievement training. The purposes for providing n-Ach training were three-fold: 1) to help mothers to understand n-Ach behavior and characteristics of high n-Ach persons, 2) to help mothers understand the objectives of the n-Ach training for their children, 3) to enable mothers to reinforce achievement behaviors in their children. The total training period consisted of four half-days (9:00-11:30 A.M.). The first session was an orientation period. The session began with introduction of the participants to one another. The trainer then explained the purposes of the research project on achievement training in which the children were involved, i.e. to train the

children in goal setting to meet some standard of excellence and to compete with themselves or with others. The trainer also explained the relationship of child rearing practices and achievement motivation on the part of children. Some characteristics of mothers who produce high n-Ach children were cited, e.g. mothers who set high standards for their children and encourage or reward independence or self reliance. Questions and discussion were encouraged. After the break period of the morning session, the ball-toss game was introduced to the mothers and each mother had an opportunity to play according to the following sequences:

1) Each mother had free trials in which she could throw a ball into a basket while she stood at any distance she chose between one and fifteen feet from the basket. After each throw, she could move forward or backward according to her wishes. The trainer kept a record of success and failure and the mother's reaction to failure or success. After all the mothers had played the game, a discussion period ensued. Topics covered in the discussion included individual differences in goal setting, reactions to success and failure, whether or not knowledge of results or feedback helped the mothers to alter their goal, how many mothers chose moderate risk-taking, and how many mothers made extreme risk-taking choices. Some standard questions were raised: Is moderate risk the same for everyone? How did you decide where to stand? Did you have any particular goal in mind? How did you feel when you succeeded or failed?

2) Each mother then played the ball-toss game a second time; this time, however, with a contract. The contract required each mother to get three balls into the basket if she was to secure a reward. The reward which the mother could receive varied with the distance: the

closer to the basket that she stood, the smaller the reward; the further from the basket, the greater the reward. Mothers selected the distances they wished to stand from the basket at the beginning of the game and could not change. The trainer recorded the distance of each mother from the basket and her success or failure.

The second session began with the review of the four characteristics of achievement actions: risk-taking, use of immediate feedback to modify goals, personal responsibility, and research of the environment. Each mother was encouraged to recall her experience with the ball-toss game on the previous day. A film, "The Need to Achieve," by McClelland[1] was shown to the mothers. A discussion followed. The trainer asked mothers to tell in their own words what they saw and learned from the film. The reactions of the two fathers in the film in the helping situation were compared and discussed. The techniques of good helping was reviewed to the mothers. Then, to reinforce their understanding of the concepts, all mothers viewed the film for a second time.

The purpose of the third session was to provide an opportunity for mothers to have direct experience of achievement-oriented situations which involved actions, thoughts, and feelings related to striving for excellence. This session also aimed at reinforcing the understanding of achievement action strategies. Three paper-folding games -- airplanes, boats, and paradisal dome -- were used.

The trainer began the demonstration by showing how to fold an airplane and providing the information about "cost" and "selling prices"

[1]"The Need to Achieve" (film), Focus on Behavior Series (No. 3), E.T.V. Network.

of the airplane. Following this, the mothers were asked to set goals for the number of products they could make in a six minute production period. Each mother wrote down her goal on a piece of paper and the trainer provided each mother with enough paper fo fold, plus some extra paper. The trainer then told them the criteria for acceptable products. The trainer told the mothers when to start and when to stop folding. Then the trainer examined their products to determine whether or not they met acceptable criteria and whether the mothers had set realistic goals. The mothers were asked how they felt while involved in the game. Did they watch what others were doing? Did they improve their own methods by watching others? Did they realize their own limitations?

After the discussion, the trainer told the group about a business contract with the government to build a boat, and a cost and selling price were given. Each mother could sign a contract to make a certain number of products; one could only receive profits for that number, even if one made more than the agreed on number. The trainer began by demonstrating how to make a boat which would be considered acceptable. The criteria for a good product also were told to the mothers. Then each mother in the group had to tell the number of boats she wished to produce. The trainer told the mothers the starting and finishing times. After the game, discussion similar to that held after the first game followed.

The third game, the paradisal dome, followed the same method. However, for this game the mothers were told that they could work in groups as part of a team and share the profits or losses, although each mother also had the option of working independently.

The fourth session was the last session. Each mother was asked to write down her future goals and what she wanted her children to be. The purposes of the research project on achievement training of Head Start children were reviewed to the mothers again and the trainer told them about the methods of training by briefly demonstrating the achievement games which would be used in training children. These included the monkey chain game, tower construction, peg board designs, and tinker toy constructions. The reward system which would be used to reinforce achievement behavior was described to the mothers. Mothers also were requested to watch for a prize or a report card which their children would bring home. They were encouraged to ask their children what they had done to win a prize. It was suggested that praise and encouragement of achievement behavior at home should be given to their children.

The proposal was made to the mothers that they get together and exchange information about their childrens' performance at school and their own achievement behavior. The trainer also was available to attend their sessions and answer any questions.

Finally, the evaluation showed that those mothers who attended the n-Ach sessions regarded them as "personally worthwhile" and "useful in helping my child," and they believed that the achievement training helped them in goal setting for themselves as well as for their children. They also believed that the achievement training would help their children to succeed better in school.

One mother volunteered to work as assistant to the trainer in achievement training and finally she became one of the trainers at a Head Start center. Several mothers talked to the trainer about their

goals to continue their educations in the city college. Two mothers discussed a possibility for their children to go to first grade rather than to kindergarten. They also discussed the education of their older children and the possibility of procuring summer jobs for them in an educational institution.

Results

Table 3 shows the IQ of different sample groups. The means of the combined T_1 and T_2 IQs for boys and girls in n-Ach training are 100.92 and 98.04 respectively. The means of the IQs in the combined non-n-Ach training group are 95.09 for boys and 95.07 for girls.

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see Table 3

Table 4 presents a summary of 2 by 2 analysis of variance. The increase in the IQ among the n-Ach training Ss, when compared with those in the non-nAch training group is not statistically significant ($.05 < p < .1$).

However, the change was as predicted. There were no sex differences. The interaction of sex and n-Ach training is borderline in significance, with a p level very close to .05.

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see Table 4

Figure 1 shows the degree of the effect of training as measured by the Stanford-Binet Intelligence Scale; it indicates

that boys gained more from the training than girls.

see Figure 1

Table 5 presents pre-test and post-test need achievement scores as measured by Aronson Graphic Expressions Design 1. The n-Ach scores are obtained from D-F (Discrete-Fuzzy). In the n-Ach training group the mean of n-Ach scores of boys is 5.75 and the post-test mean is 7.21. For girls, the pre- and post-n-Ach mean scores are 3.76 and 4.52 respectively. In the non-n-Ach training group, the pre-test mean scores of n-Ach for boys is -0.20 and the post mean scores is -1.26. The pre and post mean n-Ach scores for girls are 0.71 and 0.71 respectively.

see Table 5

The pre and post mean scores of Aronson Graphic Expressions Design 2 are presented in Table 6.

see Table 6

An analysis of covariance was employed in the treatment of need for achievement scores on D-F (discrete minus fuzzy lines) as measured by the Aronson Graphic Expressions. Since previous research has indicated that the two parts of this test may act differently, both parts were analyzed separately in a repeated measure design. This analysis indicates that there was no effect

for treatment, sex, or design of test, and that there were no significant interactions. These results are presented in Table 7.

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see Table 7

The fact that there were no significant differences in need for achievement as measured by the Aronson Graphic Expressions for those children who had received n-Ach training leads to the rejection of hypothesis 2.

Discussion

The major purpose of this study was to determine whether McClelland's n-Ach training techniques could be adapted for use among four and five year-old Head Start children. The results indicate a tested IQ change in the predicted direction occurred but was not statistically significant (.05 p .1). Several factors may have contributed to a reduction in the increase in IQ scores. 1) The initial IQs of the tested subjects in this study were high as compared with those found in other investigations with comparable subjects (Kennedy et al, 1963 and Gray and Klaus, 1965) and were similar to those secured by Gray and Klaus at the end of their intervention treatment. Mean IQ of T_1 at the beginning of this study was 92.4. In Gray and Klaus' research, mean IQ shifted from 86 to 95 for T_1 and from 91 to 96 for T_2. It will be noted that the higher initial IQ resulted here in smaller absolute increase. It is possible that the children in this study were already functioning at IQ levels approaching optimum and that for this reason, further increase in IQ was particularly difficult to accomplish.

2) Although n-Ach training in this study was carried out over a period of three months, it was conducted for only twenty minutes a day, so that because of Head Start holidays, field trips, special events, and the high frequency of children's absences, the average number of training periods received by each child was about thirty and the number of hours of training received by most children totaled only about ten. These ten hours of training contrasted with the extensive training conducted by other investigators (e.g. two and three summers in the case of Gray and Klaus) suggest that further sophistication of the present procedure may result in significant increases in n-Ach even with extremely limited periods of training, particularly if training is incorporated with other Head Start or nursery school experiences and with training of mothers. Furthermore, when it is considered that the training instruments and methods which this study employed were deliberately designed to avoid direct cognitive influence upon Stanford-Binet Intelligence Scale Test performance --in contrast with Gray and Klaus who were consciuosly interventionist in this area-- the implications for short term n-Ach training seem all the more promising.

3) Further, this research was plagued by many idiosyncratic practical problems which surely interfered with the training experiences of the subjects, but which were unrelated to the research design. For example, the study began by employing two part-time graduate research assistants for four Head Start centers. In the midst of the training, unforeseen circumstances led to the loss of one of these very essential and highly competent research assistants. During the

period the project was seeking a new research assistant --and we found it was difficult to locate competent, reliable female trainers who were willing to walk into the areas of the centers-- the project had to rely on one trained person and the aid of undergrdduate substitutes to cover all four centers. Further, the new research assistant, when she was located, required a period --necessarily in part acquired on the job-- to develop her training skills and to familiarize herself with the materials.

Finally, although it is true that post facto explanations are always inconclusive, it is the case that the direction of these results is nicely consistent with the findings of Callard (1964) and those of Veroff (1969). First, the gain in IQ, if it occurred, occurred for boys, not for girls. To the extent that the treatment was designed to effect autonomous achievement strivings rather than create social pressure for achievement --and it was so designed-- this is the result we might expect in the light of Veroff's interpretation. It should be emphasized in this regard that there was a conscious effort in this investigation to avoid the social pressure of the sort mothers who responded positively to Callard's measure of achievement demand would be expected to make. On the contrary, the attempt was to encourage the child to develop a pleasurable sense of competition with self which was reinforced by the four elements of achievement training (goal setting, development of language of achievement, cognitive supports, and group supports). With regard to the latter, it is important to note that group supports were used

as supports and not as a basis for "social comparison" or as the source of social pressure. As such, group supports were expected to represent reinforcement of a sense of autonomous mastery. Following Zigler and Butterfield's model this gain in IQ can be ascribed to increased achievement motivation because cognitive in-puts were consciously avoided or reduced to lowest possible levels (in contrast with Gray and Klaus' investigation where cognitive development was a stated objective). In fact, subjects were removed for the training period from Head Start cognitive growth experiences given the control group at the same time as n-Ach training was underway. IQ testing also avoided the effect of administrator rapport or social pressure from a familiar person (Sack, 1952) and was expressly intended to measure only the consequences ofheightened achievement motivation. If we consider this IQ measure as an indication of increased autonomous (as opposed to social) achievement motivation, it is worthy of note that there was an increase in measured IQ performance. Taken together, these results, plus observations of behavior change, while not conclusive, are suggestive support for the position that it may be possible to increase autonomous achievement motivation among pre-school age boys.

This interpretation of the change in IQ scores is also consonant with the insignificance of changes in Aronson Graphic Expressions scores, for D-F scores were found by Aronson to correlate positively with T.A.T. in n-Ach results and as such, may be interpreted as reflecting integrated achievement motivation which

develops at later age levels than those of our subjects. Veroff's interpretation can lead to the hypothesis that neither for boys nor for girls at this age were the levels of autonomous and social achievement motivation such as to result in treatment having an integrative effect and so increasing integrated achievement motivation. It is also the case that training was directed only at autonomous achivevment motivation.

It is to be supposed if these interpretations are accurate that socially induced changes in achievement motivation might be effective with boys and girls at this age level (Lahtinen, 1964). We do not know, however, what are the processes whereby integration or achievement motivation occurs at this or other age levels.

Although n-Ach training for pre-school disadvantaged children did not lead to conclusive results which are quantifiable in this study, the observation record made by the trainers did show changes in behavior with the passage of training time. Children were reported, for example, as recalling with increasing effectiveness their accomplishments of previous days. They also evidenced more desire to master tasks by themselves and to select more realistic goals. Reports of trainers refer with increasing frequency to use by subjects of such phrases as "I tried to...," "I got a prize because I did it by myself and finished," etc. Furthermore, children gave evidence of a sense of pleasurable feeling in their success.

In conclusion, the authors are of the opinion that short term intervention by adaptation of McClelland's n-Ach training holds

promise, first, as a means of clarifying issues of the relationships among n-Ach and n-Ach related variables and second,as a means, with further refinement, of producing desirable changes in motivation patterns of disadvataged children, particularly if it can be integrated with Head Start or nursery school programs and training of mothers.

Table 1

Characteristics of the N-Ach Training (T_1 and T_2) and non-N-Ach Training (NT_1 and NT_2) Samples at the Onset of the Study: Sex, CA, MA, and IQ

Group	Sex	N	CA Range	CA Mean	MA Range	MA Mean	IQ Range	IQ Mean
T_1	Male	12	50.0-60.5	54.5	42.0-66.0	50.9	79-120	92.3
	Female	9	53.0-58.0	55.3	42.0-67.5	56.2	78-118	101.1
	Male and Female	21	50.0-60.5	55.1	42.0-67.5	53.1	78-120	96.1
T_2	Male	12	46.0-69.0	53.3	---	---	---	---
	Female	14	45.0-57.0	53.5	---	---	---	---
	Male and Female	26	45.0-60.0	53.4	---	---	---	---
NT_1	Male	11	48.0-58.0	52.9	36.0-55.5	46.7	63-107	90.8
	Female	7	52.0-62.0	56.0	45.5 54.5	53.6	72-114	89.9
	Male and Female	18	48.0-62.0	54.1	36.0-58.5	49.4	63-114	92.4
NT_2	Male	11	50.0-61.0	55.6	---	---	---	---
	Female	8	53.0-58.0	54.8	---	---	---	---
	Male and Female	19	50.0-61.0	54.9	---	---	---	---
T_1 and T_2	Male	24	46.0-60.5	53.9	---	---	---	---
	Female	23	45.0-58.0	54.4	---	---	---	---
	Male and Female	47	45.0-60.5	54.1	---	---	---	---
Total NT_1 and NT_2	Male	22	48.0-61.0	54.2	---	---	---	---
	Female	15	50.0-62.0	55.0	---	---	---	---
	Male and Female	37	48.0-62.0	54.5	---	---	---	---

Table 2

Characteristics of the Sample by Head Start Center at the Conclusion of the Study: Sex, CA, MA, and IQ

Head Start Center	Sex	N	CA		MA		IQ	
			Range	Mean	Range	Mean	Range	Mean
A	Male	13	50.0-62.0	58.2	49.5-73.5	57.0	77-120	98.5
	Female	5	53.5-62.0	57.7	57.0-63.0	58.8	93-109	100.1
B	Male	15	52.5-64.5	59.3	52.5-90.0	59.4	85-152	99.1
	Female	8	54.0-63.5	59.8	49.5-84.0	58.2	84-140	98.3
C	Male	8	54.0-63.5	56.8	51.0-60.0	56.3	88-109	98.6
	Female	19	49.0-62.5	59.6	49.5-64.5	57.0	79-111	96.0
D	Male	10	54.5-64.5	59.3	49.5-69.0	56.7	82-118	95.0
	Female	6	54.5-62.0	58.8	45.0-61.5	55.3	79-101	92.3
A+B+C+D	Male	46	50.0-64.5	58.5	49.5-90.0	57.6	77-152	97.9
	Female	38	49.0-63.5	59.2	45.0-84.0	57.2	79-140	96.8
Total		84	49.0-64.5	58.8	45.0-90.0	57.4	77-152	96.7

Table 3

Mean IQ of the Sample at the Conclusion of the Study, by Group and Sex

Group	Sex	N	X IQ
T_1	Male	12	102.42
	Female	9	95.89
T_2	Male	12	99.42
	Female	14	99.43
$T_1 + T_2$	Male	24	100.92
	Female	23	98.04
NT_1	Male	11	95.91
	Female	7	97.00
NT_2	Male	11	94.27
	Female	8	93.38
$NT_1 + NT_2$	Male	22	95.09
	Female	15	95.07

Table 4

Analysis of Variance of IQ Score Differences Between Head Start Boys and Girls Who Received N-Ach Training and Who Did Not Receive Such Training

Source	SS	df	MS	F
Sex (A)	42.501	1	42.501	N. S.
n-Ach training (B)	392.745	1	392.745	2.830*
A X B	433.988	1	433.988	3.127*
Within Cell	11101.540	80	138.769	-----

*.05<p<.1

Table 5

Pre and Post Test Need Achievement as Measured

by A. G. E. Design 1 by Group and Sex

		Groups			
		n-Ach Training		non-n-Ach Training	
		Mean	SD	Mean	SD
Pre-Test	Male	5.75	12.17	- .20	8.12
	Female	2.76	12.51	2.71	13.68
Post-Test	Male	6.21	15.31	-1.26	12.89
	Female	4.52	19.52	.71	14.68

Table 6

Pre and Post-Test Need Achievement as Measured

by A. G. E. Design 2 by Group and Sex

		Groups			
		n-Ach Training		non-n-Ach Training	
		Mean	SD	Mean	SD
Pre-Test	Male	1.17	8.34	-3.07	5.90
	Female	4.72	9.97	.86	7.03
Post-Test	Male	6.04	22.27	2.00	14.31
	Female	-1.95	11.36	5.71	16.07

Table 7

Analysis of Covariance for
Need Achievement Scores as Measured by A. G E.
Design 1 & Design 2

Source	M's	F
n- ch training (A)	374.73	<1
sex (B)	12.12	<1
AB	193.08	<1
S's within group	4344.10	
Test Design (C)	176.55	<1
AC	1609.94	<1
BC	300.84	<1
ABC	2.45	<1
C x S's within group	3080.46	

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